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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/560,077	05/15/2006	Shintaro Kobayashi	P28961	1087
7055 7590 04/06/2010 GREENBLUM & BERNSTEIN, P.L.C. 1950 ROLAND CLARKE PLACE RESTON, VA 20191			EXAMINER IQBAL, SYED TAHA	
			ART UNIT 1793	PAPER NUMBER
			NOTIFICATION DATE 04/06/2010	DELIVERY MODE ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

gbpatent@gbpatent.com
pto@gbpatent.com

Office Action Summary	Application No.	Applicant(s)	
	10/560,077	KOBAYASHI ET AL.	
	Examiner	Art Unit	
	SYED IQBAL	1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12 January 2010.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 3, 6, 7, 9, 10, 13-15 and 18 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 3, 6, 7, 9, 10, 13, 14, 15 and 18 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION***Status of Claims***

Claims 1, 3 and 6-17 were previously rejected. Claims 3, 6, 7, 9, 10, 13, 14, 15 and 18 are now pending. Claim 18 is new.

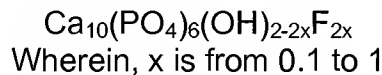
Claims 3, 6, 7, 9, 10, 13, 14, 15 and 18 are rejected under 35

U.S.C. 103(a) as obvious over Atsumi JP10118167, in view of Ichitsuka et al. US5651884.

Atsumi teaches (Pg 21 Para [0030]) the compounds $\text{Ca}_{10}(\text{PO}_4)_6(\text{OH})_2$ and $\text{Ca}_{10}(\text{PO}_4)_6(\text{X})_2$, where X is a halogen, which are species of the formula $\text{Ca}_{10}(\text{PO}_4)_6((\text{OH})_{1-x}\text{A}_x)_2$. Atsumi also teaches trivalent iron from an iron nitrate source may be bonded to the phosphate group of the compounds discussed above (Pg 51 Para [0097]). The reference gives examples of the amounts of Fe^{+3} that are on the apatite. The weight percents of the metals are disclosed (Pg 41 table A). For instance, in example 1, 1 wt% and in example 11, 10 wt% of Fe was used per 135g of apatite (Pg 32 Para [0055]), which would fall within the range of 0.1 to 100 mg per gram of the apatite. The reference discloses species $\text{Ca}_{10}(\text{PO}_4)_6\text{F}_2$ (Pg20 Para [0027]) of the genus of instant claim1. A particle size of 2 to 100 μm is also taught (Col. 9 line 27). Atsumi teaches using a slurry to contact the apatite and the iron (Para [0055] and [0056]). However, the difference between the invention disclosed by Atsumi and that recited in claim 13 is that claim 13 requires the apatite composition to be filled into a column and Fe ions supported on the apatite composition, with size of 0.5 μm to 100 μm , by a solution with a flow rate of 0.1 to 10 ml/min.

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Ichitsuka et al teaches a packing material for liquid chromatography (Abstract) useful in applications such as blood treatment with columns and liquid chromatography used in separating and purifying proteins, enzymes, nucleic acid phosphoric acid etc. The material comprises at least one material selected from the group consisting of $\text{Ca}_{10}(\text{PO}_4)_6(\text{OH})_2$, $\text{Ca}_3(\text{PO}_4)_2$, $\text{Ca}_2\text{P}_2\text{O}_7$, $\text{Ca}(\text{PO}_3)_2$, $\text{Ca}_{10}(\text{PO}_4)_6\text{F}_2$ and $\text{Ca}_{10}(\text{PO}_4)_6\text{Cl}_2$. A particle size of 2 to 100 pm is also taught (Col. 9 line 27). Also taught is packing for liquid chromatography comprising fluoroapatite represented by the formula:



Ichitsuka discloses packing the packing material in a column and passing a mobile phase over it (Col. 10 line 10 and line 48).

At the time of invention it would have been obvious to one having an ordinary level of skill in the art to use the column of Ichitsuka and fill it with the adsorbent composition of Atsumi since there is a reasonable expectation of success for using the apatite composition in a column as an adsorbent, as shown by Ichitsuka. Furthermore, it would be obvious to one having an ordinary level of skill in the art to perform routine experimentation to find a suitable or optimal value for parameters such as the particle size and Fe flow rate.

Regarding claim 18, it would also have been obvious for one skilled in the art to use any precursor for the iron metal as the iron ion precursor lacks criticality and a functional equivalent is taught in the prior art.

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Applicants' arguments filed 01/12/2010 have been fully considered but they are not persuasive. Regarding applicants' argument that the flow rate provides sufficient bonding of the Fe on the apatite, the reference teaches bonding of the Fe on the apatite and therefore the flow rate used by the prior art would suffice. The applicants do not provide why it would be not be obvious for one skilled in the art to determine a suitable flow rate. In addition, there is no evidence of record for the contention of unexpected results emanating from using the flow rate in combination of the particle size.

Applicants further argue that Atsumi or Ichitsuka does not teach passing a solution containing Fe^{3+} through an adsorbent filling space filled with the apparatus filled with the apatite at a flow rate of 0.1ml/min to 100ml/min. However, this limitation would be obvious over Atsumi *in view* of Ichitsuka since Atsumi teaches using a slurry of the iron to contact with the apatite to support the metal and Ichitsuka teaches the column for adsorption.

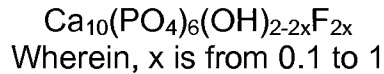
Claims 3, 6, 7, 9, 10, 13, 14, 15 and 18 are rejected under 35

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Ichitsuka et al teaches a packing material for liquid chromatography (Abstract) useful in applications such as blood treatment with columns and liquid chromatography used in separating and purifying proteins, enzymes, nucleic acid phosphoric acid etc. The material comprises at least one material selected from the group consisting of $\text{Ca}_{10}(\text{PO}_4)_6(\text{OH})_2$, $\text{Ca}_3(\text{PO}_4)_2$, $\text{Ca}_2\text{P}_2\text{O}_7$, $\text{Ca}(\text{PO}_3)_2$, $\text{Ca}_{10}(\text{PO}_4)_6\text{F}_2$ and $\text{Ca}_{10}(\text{PO}_4)_6\text{Cl}_2$. A particle size of 2 to 100 pm is also taught

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(Col. 9 line 27). Also taught is packing for liquid chromatography comprising fluoroapatite represented by the formula:



Ichitsuka discloses packing the packing material in a column and passing a mobile phase over it (Col. 10 line 10 and line 48). However, the difference between the invention disclosed by Ichitsuka and that recited in claim 13 is that claim 13 requires the apatite composition to be filled into a column and Fe ions supported on the apatite composition, with size of 0.5 μm to 100 μm , by a solution with a flow rate of 0.1 to 10 ml/min.

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At the time of invention it would have been obvious to one having an ordinary level of skill in the art to support iron with a slurry on the apatite composition taught by Ichitsuka. One would be motivated to do so because the adsorbent composition of Atsumi is substantially similar to that of Ichitsuka and the addition would provide greater adsorption properties for a variety of materials (Atsumi Para [0019]). Furthermore, it would have been within the skill of one having an ordinary level of skill in the art to perform routine experimentation to determine a suitable or optimal flow rate of Fe ions solution to use on the particles of Ichitsuka.

Regarding claim 18, it would also have been obvious for one skilled in the art to use any precursor for the iron metal as the iron ion precursor lacks criticality and a functional equivalent is taught in the prior art.

Applicants' arguments filed 01/12/2010 have been fully considered but they are not persuasive. Regarding applicants' argument that the flow rate provides sufficient bonding of the Fe on the apatite, the reference teaches bonding of the Fe on the apatite and therefore the flow rate used by the prior art would suffice. The applicants do not provide why it would be not be obvious for one skilled in the art to determine a suitable flow rate. In addition, there is no evidence of record for the contention of unexpected results emanating from using the flow rate in combination of the particle size.

Applicants further argue that Atsumi or Ichitsuka does not teach passing a solution containing Fe^{3+} through an adsorbent filling space filled with the apparatus filled with the apatite at a flow rate of 0.1ml/min to 100ml/min.

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However, this limitation would be obvious over Ichitsuka *in view* of Atsumi since Atsumi teaches using a slurry of the iron to contact with the apatite to support the metal and Ichitsuka teaches the column for adsorption.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to SYED IQBAL whose telephone number is (571)270-5857. The examiner can normally be reached on Monday to Thursday 7:30am EST to 6:00pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stanley S. Silverman can be reached on 5712721358.

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The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/S. I./
Examiner, Art Unit 1793